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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/567,017

02/03/2006

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EXAMINER

VERDERAME, ANNA L

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/567,017	Applicant(s) TOMEKAWA ET AL.	
	Examiner Anna L. Verderame	Art Unit 1756	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 24-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 14-26 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/03/06, 02/03/06</u>  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ogura et al. JP-03129349.

In figure 2 Ogura et al. teaches a prior art method of forming patterned substrate comprising the steps of forming a chromium layer 2 on a glass substrate, forming a photosensitive layer 3 on the chromium layer, exposing the photosensitive layer, removing the exposed portions of the photosensitive layer, and etching the chromium layer using the patterned photosensitive layer as a mask. In figure 1, Ogura et al. teaches a method for forming a patterned substrate wherein a transition metal oxide layer 11 is formed on a glass substrate 1, the transition metal oxide layer is exposed, the oxide layer is then wet etched using a NaOH solution(abstract). In figure 1 a positive-type photoresist is used, in which the exposed portions are removed by the development step. In figure 3, a negative-type photoresist is used in which the

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unexposed portions of the resist are removed in the development step. Use of the transition metal oxide layer instead of the traditional photoresist allows for high pattern accuracy(abstract). Suitable transition metal oxides are listed and include  $\text{WO}_3$  and  $\text{MoO}_3$ (p.2 column 1).

An embodiment where the metal-oxide film was formed on a glass substrate having a chromium layer formed thereon would have been obvious based on the disclosure of this reference. This embodiment would have benefits including more efficient exposure(light is reflected off of the chromium layer and therefore passes through the resist twice), and a more durable master disk(patterned metal (see figure 2f)).

3. Claims 14, 18, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Kishima WO01/63607 (US 7,166,417 used as a translation).

Kishima teaches a method for manufacturing a master comprising the steps of forming a  $\text{SiO}_2$  substrate by forming a layer of  $\text{SiO}_2$  on a transparent resin substrate or glass substrate. The silicon dioxide substrate is then given a coating of a heat-sensitive material [(WO page 8 lines 15-30)/(5/58-67)]. The heat-sensitive material is then exposed to a laser beam in accordance with a pattern[(WO page 8 lines 15-30)/ (5/65-6/3)]. The patterned heat-sensitive layer is developed using a 1 to3 % aqueous alkaline solution of tetra methyl ammonium hydroxide[(WO page 11 lines 1-15)/ (9/24-28)]. The patterned heat-sensitive layer is used as an etching mask to etch the substrate [(WO page 9 lines 22-28)/(6/51-63)]. The heat sensitive material layer may function as a

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positive or a negative resist[(WO page 9)(6/47-50). The heat-sensitive layer is exposed using a laser having a wavelength of 390 to 410 nm[(WO page 11 lines 1-15)/(9/19-22)].

With respect to the limitation that the substrate is in the shape of a disc-like stamper of which inner and outer diameters are process, the examiner points to disclosure of a circular substrate at [WO page 18 lines 1-15)/(12/17)]. This disclosure indicates that at least the outer diameter of the substrate are processed.

4. Claims 14-16, 18-19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kouchiyama et al. WO 03/071356(US 7,175,962 used as a translation).

In example 2, Kouchiyama et al. teaches the fabrication of a resist master for optical disks in which incompletely oxidized sexavalent molybdenum is used as the resist material. The resist material was formed on a glass substrate by sputtering. The sputtering was carried out with elemental molybdenum as a sputtering target in and argon-oxygen mixed atmosphere, of which the oxygen gas concentration was changed to control the degree of oxidation of the incompletely oxidized molybdenum. The incompletely oxidized molybdenum resist acts as a negative-type resist to the tetramethylammonium hydroxide solution(11/50-13/2).

In example 3, a resist master for optical discs was prepared with incompletely oxidized sexavalent tungsten and molybdenum resist as resist materials. An amorphous silicon intermediate layer 101 having a thickness of 80 nm was formed on a substrate 100 of a silicon wafer by sputtering. A resist layer 102 of incompletely oxidized tungsten and molybdenum was further uniformly deposited on the substrate by sputtering. The sputtering was performed in an argon atmosphere. This resist material

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functions as a positive-type resist(13/44-14/60). Addition of Mo to  $W_{1-x}O_x$  improves the exposure sensitivity of the resist by about 30%(9/57-59). Materials having low thermal conductivity for use in the intermediate layer 101 are taught at (10/9-30) and include  $SiO_2$ , SiN,  $Al_2O_3$  or an ultraviolet curing resin. Use of ultraviolet curable resins as the material of the intermediate layer is explained by the fact that they have thermal conductivities as low as plastic. A substrate with a lower conductivity exhibits higher exposure sensitivity(10/3-5). Resist materials of the invention of this reference can be developed using alkaline developers such as KOH, NaOH,  $Na_2CO_3$ (9/15-17). Resists according to the invention of this reference can be patterned using lasers having a wavelength of 660 nm and a mercury lamp having peak wavelengths of about 185 nm, 254 nm, and 405 nm(9/1-5). Materials for the substrate include glass, plastic, silicon, alumina-titanium carbide, or nickel(7/20-22). The thickness of the resist layer is within the range of 10 to 80 nm(7/23-25).

Figure 4 teaches an embodiment in which a second resist 32 is deposited on a substrate 31, and the first resist layer 30 of an incompletely oxidized transition layer is deposited on the second resist layer 32. The first resist layer 30 is exposed and developed. The second resist layer is etched through the mask pattern of the first resist layer under etch conditions of high selectivity.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kouchiyama et al. WO 03/071356(US 7,175,962 used as a translation) in view of Sano 6,706,465.

The teachings of Kouchiyama et al. WO 03/071356(US 7,175,962 used as a translation) can be found in paragraph 4 above. However, the reference does not teach the limitations of claims 22-23 of the instant claims.

Sano et al. teaches a mastering process as illustrated in figures 1A-1F in which a stamper is completed when inner and outer diameters of the master are machined to meet a mold of an optical disc molding machine. Alternatively, as illustrated in Figs 2A-2F the stamper substrate may be machined beforehand to the stamper size and in this case the master processed through the same steps as in the second embodiment can be mounted directly as the mold to the optical disk-molding machine because of its already processed size(11/65-12-7). If the inner or outer diameter is machined to the stamper size to fit the mold of the optical disk molding machine before the resist is formed to the stamper substrate by application or the like manner, the probability of generation defects in later steps decreases and the yield can further be enhanced(15/45-50)

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the mastering process of Kouchiyama by providing a pre-machined substrate wherein the inner and outer diameters are machined to meet a mold of an

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optical disc machine or alternatively by machining the patterned master disk based on the disclosure of Sano et al.

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kouchiyama et al. WO 03/071356(US 7,175,962 used as a translation) in view of Kishima 7,166,417.

The teachings of Kouchiyama et al. are found in paragraph 4 above. However, the reference does not teach a step of etching the substrate using the thermosensitive material layer as an etching mask.

The teachings of Kishima are found in paragraph 3 above.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the mastering process of example 2 taught by Kouchiyama et al. by etching the substrate using the patterned thermosensitive layer as an etching mask based on the disclosure in Kishima et al. at [(WO page 9 line 23-page 10 lines 1-5)/(6/51-63) based on the similar structure shared by the two master discs and based on the similarity between the mastering processes and with the reasonable expectation of success.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kouchiyama et al. WO 03/071356(US 7,175,962 used as a translation) in view of Shih et al. 6,456,482.

The teachings of Kouchiyama et al. can be found in paragraph 4 above. However, the reference does not teach the limitations of claim 17 of the instant application.



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Shih et al. teaches the formation of a tungsten oxide layer by sputtering. The material is formed via a reactive sputtering of a tungsten metal in an argon and oxygen sputtering gas atmosphere having an argon:oxygen ratio of about 95:5 to about 80:20. Typically and preferably, the reactive sputtering method also employs a reactor chamber pressure of from about 1 mTorr to about 20 mTorr, and a bias sputtering power of from about 100 to 300 Watts (5/19-35).

The ranges for the instant application in mTorr are from 0.75-1.5 mTorr for the partial pressure of the argon gas and from 0.375-0.75 mTorr for the partial pressure of oxygen gas.

An embodiment where the ratio of argon:oxygen was 80:20 and the total pressure in the chamber is 1.875 mTorr would be obvious based on the disclosure of Shih et al. The partial pressure of oxygen in this embodiment would be 0.375 mTorr (0.05Pa) and the partial pressure of argon would be 1.5 mTorr (0.2 Pa).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US/20010055258- See figure 1 and disclosure at (0035) with regard to claims 22-23.
- US-6,285,424-(8/33-67)

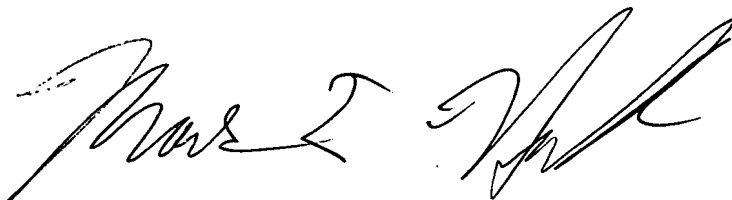
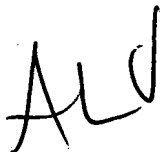
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna L. Verderame whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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